Keystone Kramming

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Testing Strategies!

- **Process of Elimination:**
  - → Eliminate answers you know are completely wrong so your chances of getting an answer right increases
- **Looking back in the text:**
  - → If there are small passages to read, read them carefully and go back if needed to thoroughly answer your question
- **Common sense:**
  - → Not every question is answered by knowing everything about the subject so just calm down and try to see what they are asking you because the answer might just be in your face.

1.
Basic Biological Principles

Objective

-Describe the characteristics of life shared by all prokaryotic and eukaryotic organisms

-Compare cellular structures and their functions in prokaryotic and eukaryotic cells

-Describe and interpret relationships between structure and function and different levels of organizations

Summary:

In basic biological principles the are telling you about cells and how they make up every living thing in the world. The cells develop and change overtime too. When talking about Eukaryotic cells we know that they seperate take apart the genetic material and pieces from the rest of the cell. Prokaryotes don't separate the genetic material when inside of the nucleus .

Multicellular organisms are made specially for different tasks within the organism and to communicate with each other.

Key terms

- Prokaryotes:

They are organisms that don't take apart material from something when inside the nucleus

- Cells:

the small organisms that make up everything
Eukaryotic: organisms that take apart organic material

- Cell Membrane:

the cell membrane has a lipid bilayer and is where proteins are embedded. It protects the cell from its surroundings

- Organisms:

It is any individual thing that shows the properties of life.

- DNA:

Also known as Deoxyribonucleic acid is a object that is found in living organisms to carry genetic instructions used in growth, development functioning and reproduction

- Evolution:

is when the heritable characteristics of biology start to change populations over the course of generations.

Key terms continued

- Nucleus:
  The center of the most important part of an object, where the basis forms and grows
- Cell specialization:
  is when a cell starts to change some of the main things such as its cytoplasm, shape inner structure and composition in order to fulfill its special duty
-
- Membrane-bound organelles:
  An example of a membrane bound organelle would be a Eukaryotic cell. Organelles are specialized structures inside of living things
- Sexual Reproduction-
  Sexual reproduction is where two morphologically distinct types of special reproductive cells known as gametes fuse with the female ovum and a male's sperm
- Asexual Reproduction- is the type of reproduction in which an offspring comes from a single organism, and only inherit the genes of that organism alone

Questions :

1. What is two differences between the prokaryotes and the eukaryotes?

2. Prokaryotic cells do not have a nucleus. What do they have in its place?

- Nucleolus
- Nucleoid region
- Deoxyribonucleic acid.
- Chromatin
- Nuclear envelope

3. Give an example of homeostasis and explain.

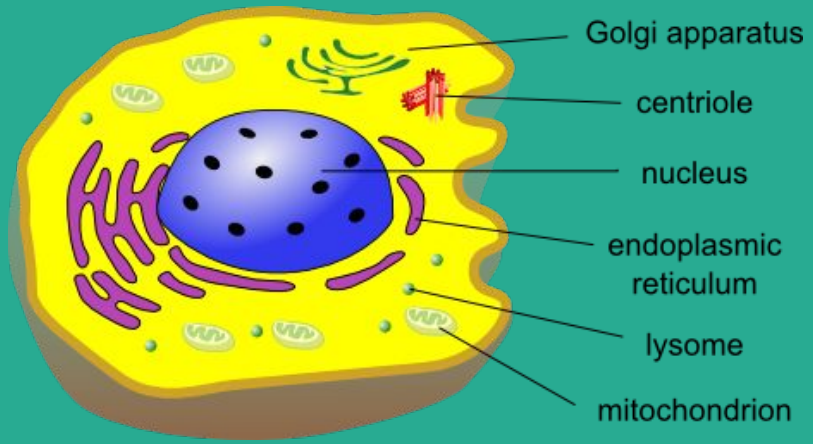
4. In asexual reproduction an organism lacks _____, making it asexual instead of sexual

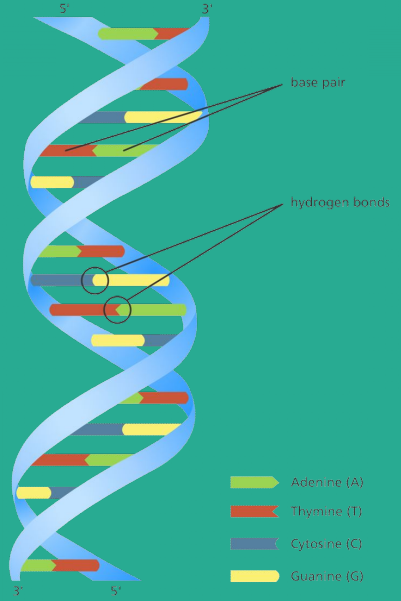
a. A partner
b. Gametes
c. Zygotes

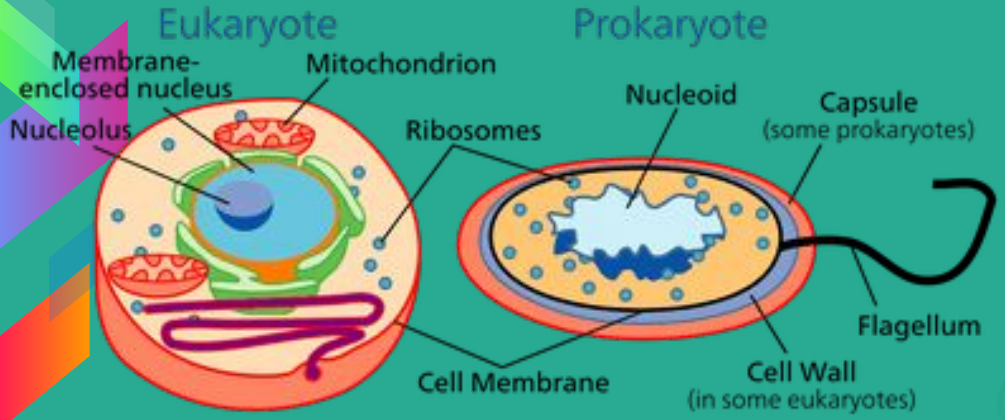
5. Most reactions happen in _____

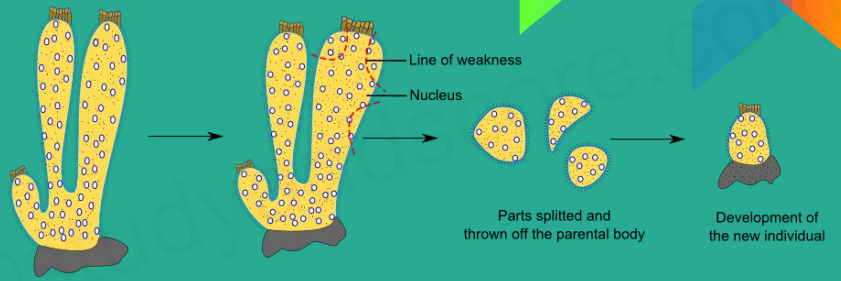
a. Cells
b. Mitocondria
c. Endoplasmic reticulum

Visuals









ASEXUAL REPRODUCTION: FISSION

2.
The Chemical Basis for Life

Objective

İ. Describe the unique properties of water and how they support life on Earth

ii. Explain how Carbon is uniquely suited to form macromolecules

iii. Compare the structure of the 4 types of macromolecules

iv. Describe the role of enzymes as catalyst in a biochemical reaction

v. Explain how factors such as temperature, pH, and concentration levels affect enzyme function

Summary

When it comes to the chemical basis of life there are many things to talk about like: enzymes, DNA, and other proteins, lipids, carbohydrates, and even the different properties of water, they all play important roles in life. Starting with enzymes, these proteins act as catalysts that increase the speed of a chemical reaction certain enzymes are made for specific functions and only work at certain temperatures and conditions. Enzymes can highly affect a reaction and completely change the results. Next there are macromolecules in the body such as carbohydrates, lipids, nucleic acids, and proteins. Hess play active roles in the cell by creating polymers from single monomers. Nucleic acids like DNA and RNA help make up the most important part of any organism, making them a sort of building block of life. There are other molecules known as organic molecules, they are often called carbon based life forms because they contain carbon, hydrogen, oxygen, nitrogen,phosphorus and other elements. Carbon is an important atom because it can form a covalent bond with almost any other atom. Carbon helps form macromolecules like lipids and other large complex molecules. Lipids are mostly fatty oils and fatty acids that connects to other atom, and have other important roles in the cell like creating energy or used for insulation. Fatty acid chains create groups of phospholipids that make up the entire plasma membrane and in the membrane other important molecules react with the help of water. Water is essential because it is the almost universal solvent and is required in order for most reactions to happen.

Key terms

Elements- substance that cannot be broken down into other substances by chemical means.

Compounds- Substance containing two or more elements that are chemically combined in a fixed ratio/amount.

Atoms-The smallest possible particle of an element.

Proton- Subatomic particle with a single unit of positive electrical charge

Neutron-Subatomic particle that is electrically neutral; has no charge.

Covalent Bond -Chemical bond that forms when two atoms share electrons.

Atomic Number-The number of protons in an atom's nucleus; it is unique for each element.

Isotope -One of several forms of an element, each containing the same number of protons in their atoms but a different number of neutrons.

Ion-An atom that has become electrically charged as a result of gaining or losing an electron.

Molecule- Two or more atoms held together by covalent bonds.

Ionic Bond- Chemical bond that occurs when an atom transfers an electron to another atom

Reactants -Starting material for a chemical reaction.

Key terms

Chemical Reactions -Breaking old & forming new chemical bonds that result in new substances.

Polar Molecule- Molecules with opposite ends have opposite electric charges.

Hydrogen Bond- Bond created by weak attraction of a slightly positive hydrogen atom to a slightly negative portion of another molecule.

Cohesion- Tendency of molecules of the same kind to stick to one another.

Adhesion -Attraction between unlike molecules.

Thermal energy- Total amount of energy associated with the random movement of atoms & molecules in a sample of matter.

Solvent- Substances that are found in solutions that are used to dissolve the other substance and becomes the greater amount.

Solution- A mixture of two or more substances

Solute- a substance in a type of solution that can be dissolved and found in a lesser amount.

Acid- Compound that donates H+ ions to an aqueous solution & measures less than 7 on the pH scale.

Base- Compound that removes H+ ions from an aqueous solution & measures more than 7 on the pH scale.

pH scale- A range of numbers used to describe how acidic or basic a solution is; ranges from 0 (most acidic) to 14 (most basic).

Questions

1. Explain the relationship between an ion and an atom.

2. Why are proteins important in the human body?

3. The _____ is where the substrate creates a reaction after binding to an enzyme

a. Catalyst
b. Active site
c. Product

Questions

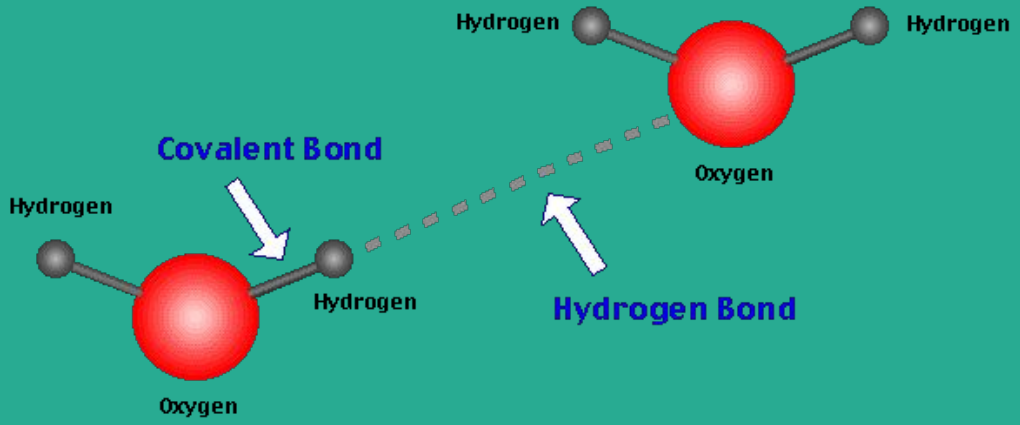
4. Polymers are just long chains of _____

a. Monomers
b. Disaccharides
c. Nucleic acid

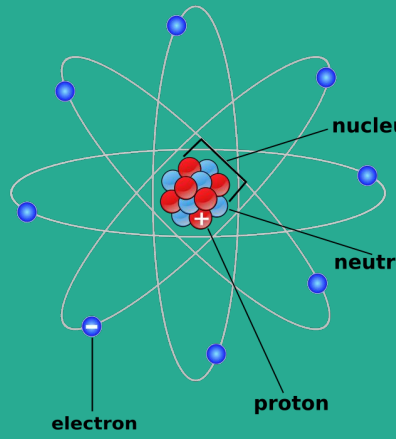
5. Polypeptides are short chains of _____ that are linked by _____

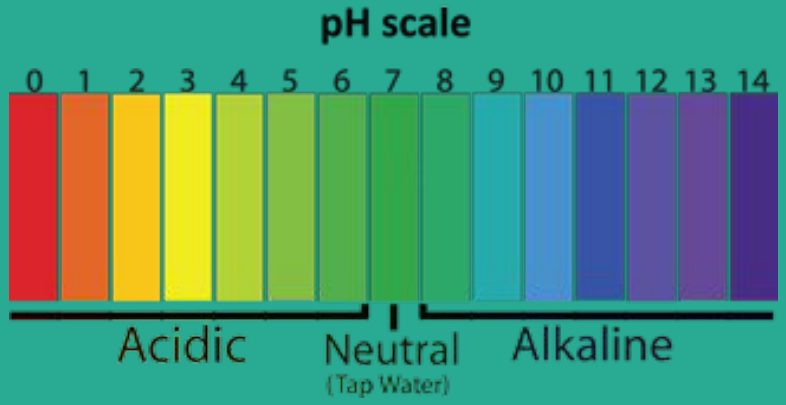
a. Nucleic acids, enzymes
b. Glucose, peptide bonds
c. Amino acids, peptide bonds

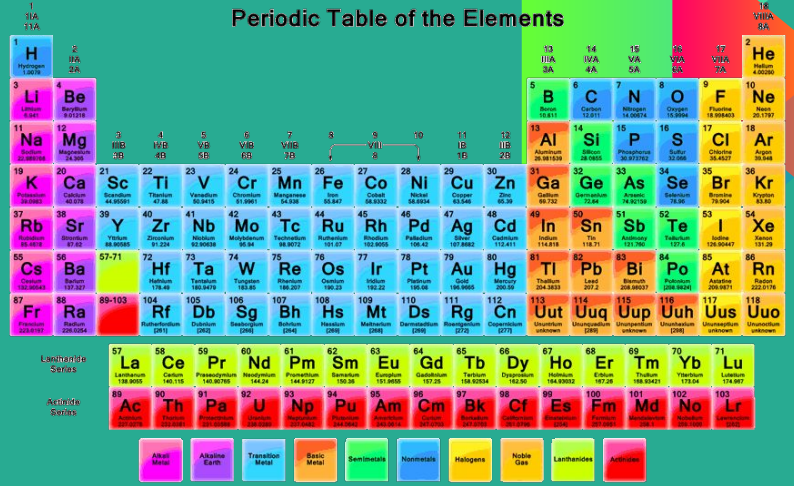
Visuals



Atomic Structure







3.
Bioenergetics: Photosynthesis and Cellular Respiration

Objective

The objective bioenergetics is to get a better understanding of photosynthesis and cellular respiration. After reviewing this section students will be able to differentiate the different transformations that take place in cellular respiration and photosynthesis.

Cellular Respiration Summary

Before cellular respiration begins, there must be a production of ATP, ATP is an important role in respiration. ATP is a small molecule that provides energy for reactions throughout the cell. Once there is a constant production of ATP cellular respiration can begin, to start ATP is supplied by breaking down molecules. Then the 3 stages begin to take place, within each phase more chemical energy is stored in glucose molecules. It begins in the cytoplasm, where glucose molecules are broken down during glycolysis. Wishing cellular respiration are other types of respiration like aerobic- which breaks down glucose and oxygen to make carbon dioxide and water, and anaerobic- which does not require oxygen (unlike aerobic), and mostly uses fermentation to convert glucose into ethanol and carbon dioxide or lactic acids, but this is at the cost of less energy being released. More stages happen in the mitochondria where reactions happen on the inner membrane where the high surface area allows there to be more reactions at once. In the mitochondria the Krebs cycle takes place and breaks down carbon compounds from glucose to form carbon dioxide. During this process ions have been building up and begin to flow along the inner membrane, as they exit ATP is produced.

Photosynthesis Summary

Photosynthesis is the process that converts light energy from the sun into chemical energy stored in compounds like glucose. The glucose produced from photosynthesis is used as energy for plants to use later or immediately. Plants also use cellular respiration but it is almost the opposite of photosynthesis. Eukaryotic cells with organelles called chloroplasts have a stroma, in the stroma are stacks of “disks” called thylakoids. Thylakoids contain chlorophyll l, the pigment that captures the energy in sunlight, and plays a pivotal role in photosynthesis. This primarily happens in a plants leaves meaning that they need carbon dioxide, in order to do get what they need the stomata opens up and releases oxygen to receive carbon dioxide. The stomata closes up in order to prevent water loss when needed. There are two phases to photosynthesis, the first being light dependent reactions and the second being light independent. In the first stage chlorophyll is used to build up the thylakoids membranes, energy is captured from sing light causing there to be a production of ATP, water molecules spilt and finally oxygen is released from the leaf. During the second stage, in the stroma, energy from the first reaction is depended on and the hydrogen and electrons also from the first stage are used to convert carbon dioxide into organic molecules.

Key Terms

Autotrophs- organisms that make their own food
Heterotrophs- animals and other organisms that must get energy from food
Photosynthesis- the process of converting energy from the sun into glucose
Chloroplasts- organelles found in the cells of plants and algae where photosynthesis occurs
Pigments- molecules that absorb light
Chlorophyll- green pigment found in most plant cells
Electron transport chain- produces NADPH in the light reaction
ATP- energy molecule; main energy currency in the cell

Hydrolyze- to break/cut with water.
adenosine diphosphate (ADP)- the molecule that remains after energy is released from hydrolyzing ATP
Oxidized- what an electron carrier becomes when it gives up its pair of electrons
Glycolysis- when one molecule of glucose it split in half.
Anaerobic- without oxygen
Aerobic- requiring oxygen

ATP synthase- allows the H+ ions back into the matrix and harnesses the energy to phosphorylate ADP
Fermentation- regeneration of empty electron carriers in the absence of oxygen.

Calvin Cycle- converts carbon dioxide into glucose using ATP

Questions

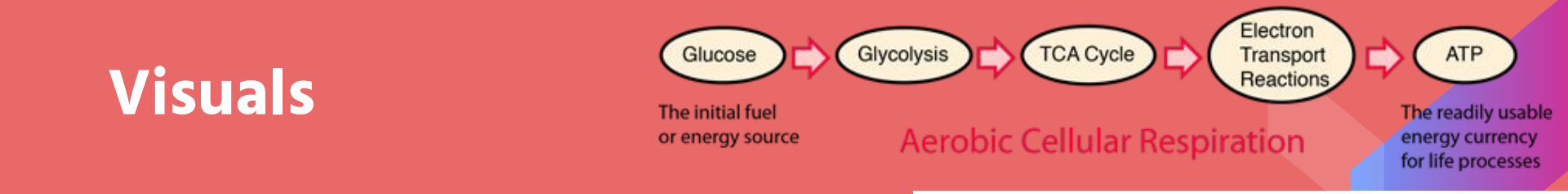
1. Where is chlorophyll located?
   a. In the stoma
   b. Inside the mitochondria
   c. In thylakoids
2. Which means or respiration does not require air?
   a. Anaerobic
   b. Aerobic
3. Which of these means to cut with water?
   a. Hydroponics
   b. Hydrolyze
   c. Hypertonic
   d. Hydraulics

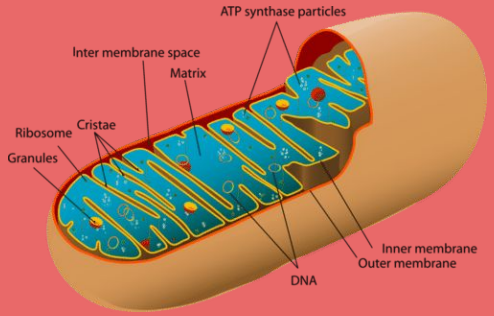
4. What does a plant gain by going through photosynthesis (what's its purpose?)

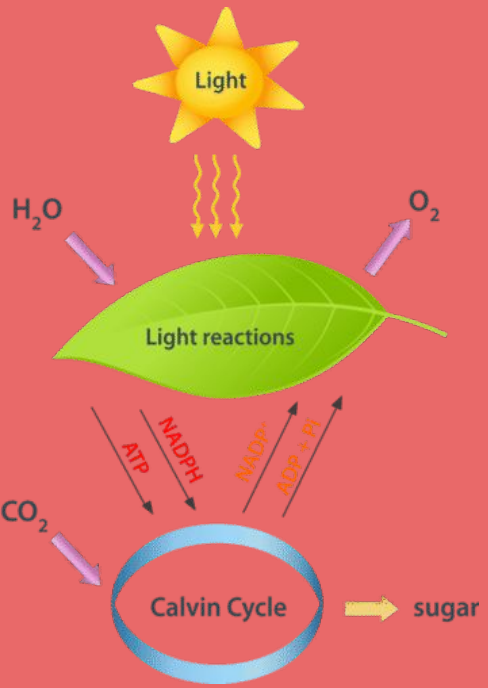
5. Describe how cellular respiration affects an organism.

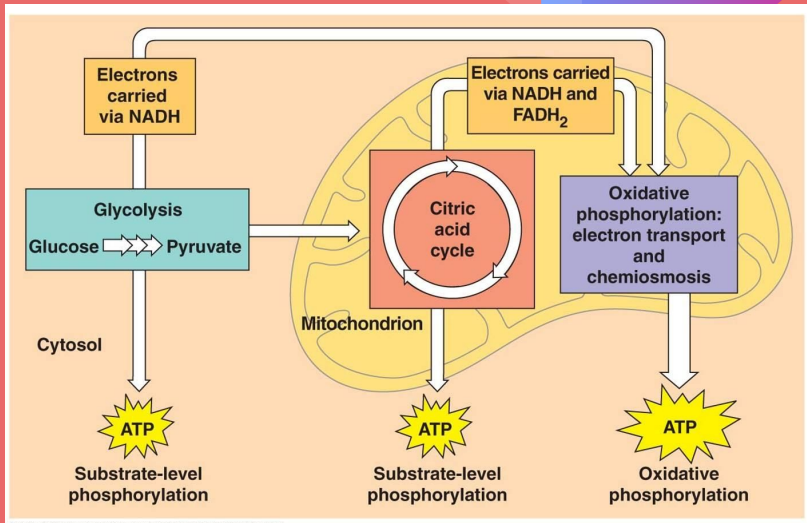
6. Explain the relationship between ATP and ADP.

Visuals


Glucose
Glycolysis
TCA Cycle
Electron Transport Reactions
ATP
The initial fuel or energy source
Aerobic Cellular Respiration
The readily usable energy currency for life processes


ATP synthase particles
Inter membrane space
Matrix
Ribosome
Cristae
Granules
Inner membrane
Outer membrane
DNA


Light
H_2O
O_2
Light reactions
ATP
NADPH
NADP+
ADP + Pi
CO_2
Calvin Cycle
sugar


Electrons carried via NADH
Electrons carried via NADH and $FADH_2$
Glycolysis
Glucose
Pyruvate
Citric acid cycle
Oxidative phosphorylation: electron transport and chemiosmosis
Mitochondrion
Cytosol
ATP
Substrate-level phosphorylation
ATP
Substrate-level phosphorylation
ATP
Oxidative phosphorylation
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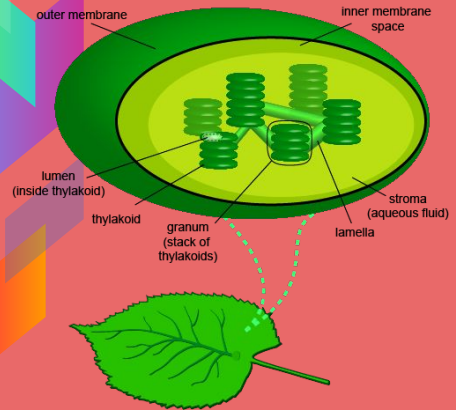
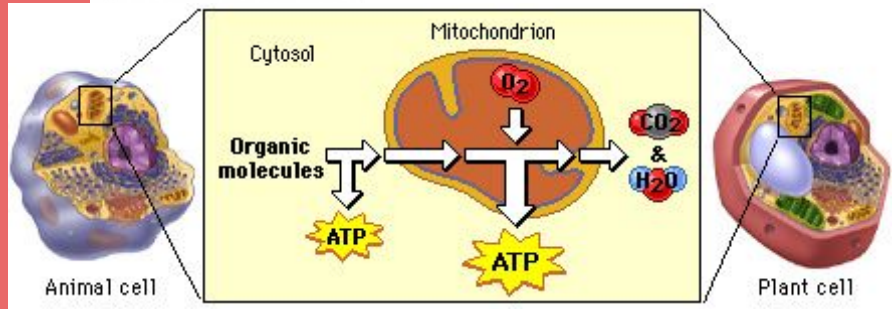

outer membrane
inner membrane space
lumen (inside thylakoid)
thylakoid
granum (stack of thylakoids)
lamella
stroma (aqueous fluid)


Mitochondrion
Cytosol
O_2
Organic molecules
CO_2 & H_2O
ATP
ATP
Animal cell
Plant cell

4. Homeostasis and Transport

Objective

Students will be able to understand Homeostasis and the transport of cells, including passive transport, active transport, and the different ways they are used and how they work.

Summary

Homeostasis is the balance of keeping internal body conditions such as oxygen, temperature, glucose, and water at an equilibrium that is regulated to make sure the body doesn't go to high or too low but maintains a balance. The body doesn't always stay balanced so one of two things occur: a negative feedback loop and a positive feedback loop. In thermoregulation, which is the regulation of internal body temperature, negative feedback loops allows any change to the internal system in the body to go back to its original, balanced state. Homeostasis also requires thermoregulation, to balance body temperature, osmoregulation to help balance out water and solutes, and gas exchange, so humans and animals can intake oxygen and release carbon dioxide.

Passive and active transport are forms of cell transport and they have a total of five subsections which do different things within the realms of cell transport. In passive transport, there is diffusion, facilitated diffusion, and osmosis. With active transport, there is endocytosis and exocytosis.

Key Terms

- Homeostasis:
  - balance of keeping internal body conditions such as oxygen, temperature, glucose, and water at an **equilibrium**
- Thermoregulation
  - regulation of internal body temperature
- Osmoregulation
  - The balance of water and solutes, dissolving molecules and ions
    - Hypotonic: decreased pressure or tone
    - Hypertonic: increased pressure or tone
    - Isotonic: balances the amount of water inside and outside of the cell
- Equilibrium
  - Maintaining Balance
- Negative Feedback loop
  - allows any change to the internal system in the body to go back to its original, balanced state
- Positive Feedback loop
  - make the changes in the body the negative feedback loops have to fix. They make changes that aren't like the usual state the body is in

Key Terms *(Cont.)*

- Passive Transport
  - any form of cellular transport that requires no form of energy
- Diffusion
  - Spreading molecules from an area of higher concentration to a lower concentration
- Facilitated Diffusion
  - Transports only certain molecules and requires a protein tunnel to bring certain materials across plasma membrane
- Osmosis
  - Spreads molecules from an area of higher concentration to lower concentration but it involves a solvent to move through a semipermeable or permeable membrane
- Active Transport
  - Any form of cellular transport that requires a form of energy
- Exocytosis
  - Process of waste molecules being transported out of the cell
- Endocytosis
  - Process of molecules moving into the cell

Essential Questions:

1. _____ allows any change to the internal system in the body to go back to its original, balanced state.
    a. Positive feedback loops
    b. Active Transport
    c. Negative feedback loops
2. What is the process of intaking oxygen and releasing carbon dioxide?
    a. Gas exchange
    b. Osmosis
    c. Thermoregulation
3. What form of energy is used when active transport occurs?
    a. Endocytosis
    b. ATP
    c. Molecular pumps

Essential Questions:

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   b. ATP**
   c. Molecular pumps

Essential Questions (cont.)

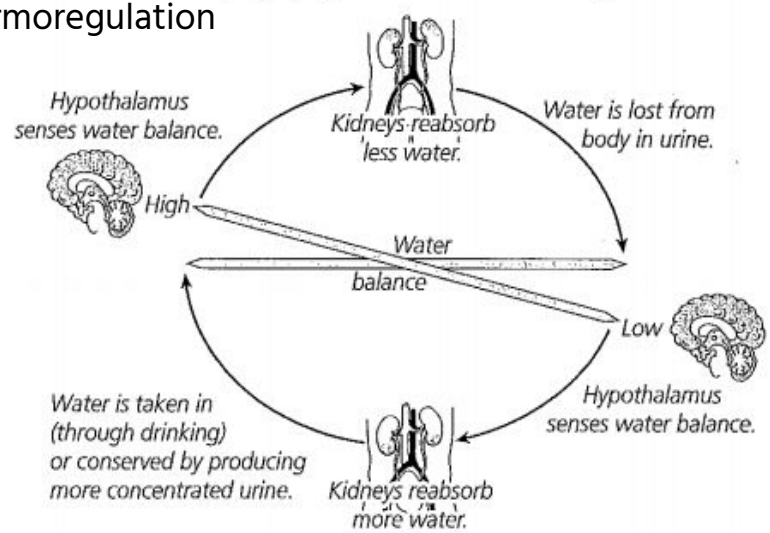
1. What is the difference between thermoregulation and osmoregulation?
   a. _____
   _____
   _____

2. What is the difference between ***diffusion*** and ***facilitated diffusion***?
   a. _____
   _____
   _____

Essential Questions (cont.)

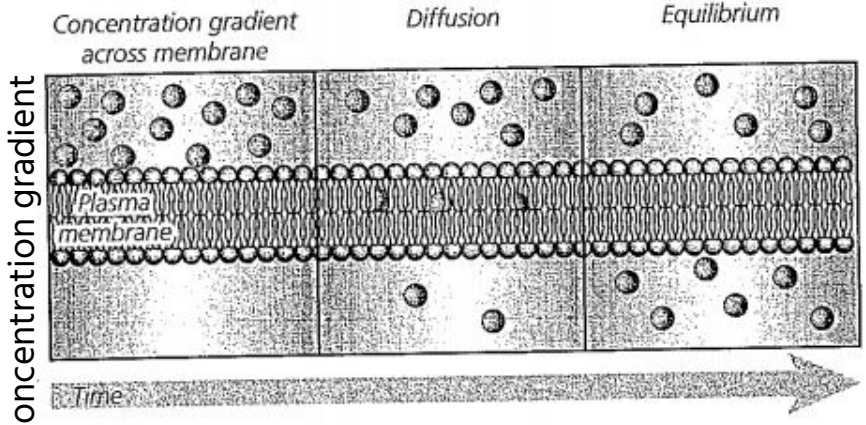
1. What is the difference between thermoregulation and osmoregulation?
    a. Thermoregulation regulates internal body tempurature while osmoregulation regulates water and solutes**
2. What is the difference between ***diffusion*** and ***facilitated diffusion***?
    a. Facilitated diffusion only allows certain molecules to go through and they can only go through a protein channel

thermoregulation



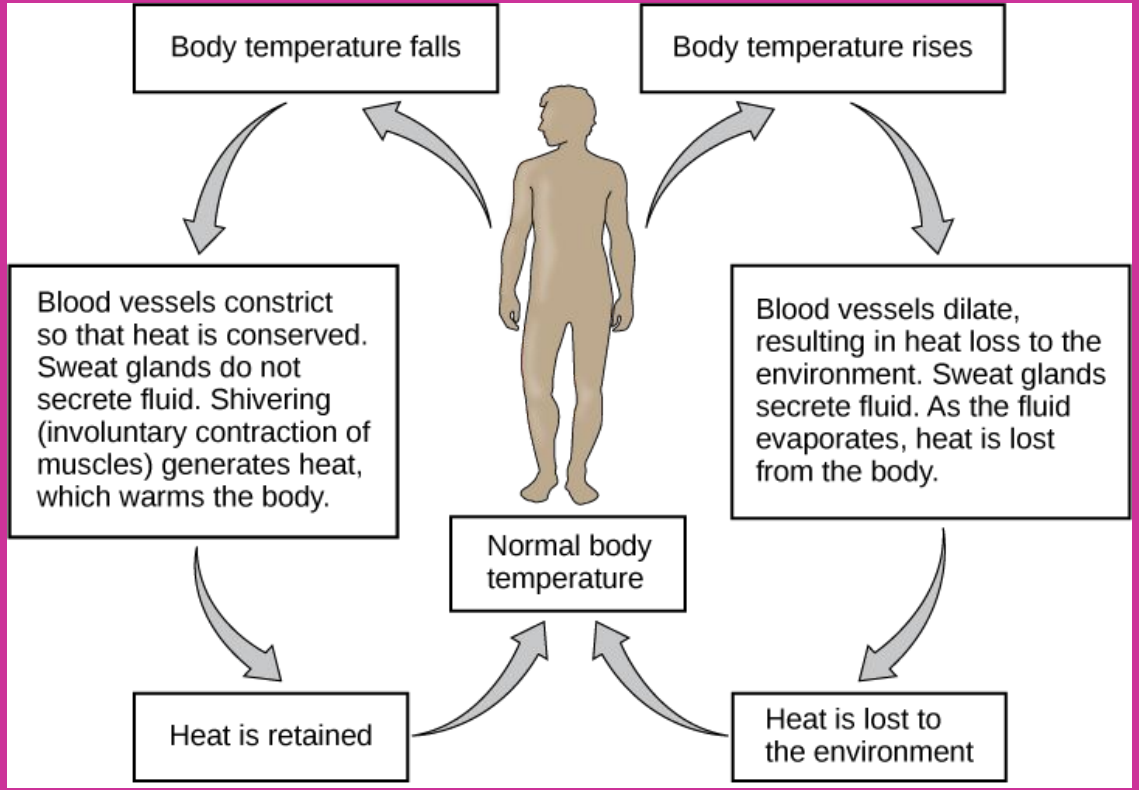
Blood vessels and the hypothalamus of the brain detect water balance in the body. The brain produces the sensation of thirst and hormones regulate water loss in the kidneys.

Visuals/Charts



Diffusion *down* a concentration gradient can cause a substance to cross a plasma membrane. Diffusion is a form of passive transport.

Visuals/Charts



5.
Cell Growth and Reproduction

Summary

The cell is the basic component of life and it holds DNA which is needed in providing information needed for proteins. All cells come from a single cell that divided into multiple cells through cell division and replication. This process is called the cell cycle. The main steps of the cell cycle are Cytokinesis, interphase and nuclear division. During nuclear division, there are 2 steps: mitosis where the cell divides in order to replace damaged cells amongst other things and meiosis where the chromosomes ‘intersect’ which is the cause of genetic variation. DNA is constantly being copied, replaced, manipulated, etc during the these processes. This is why no one is exactly like another individual. This is due to genetic variation.

What to Know

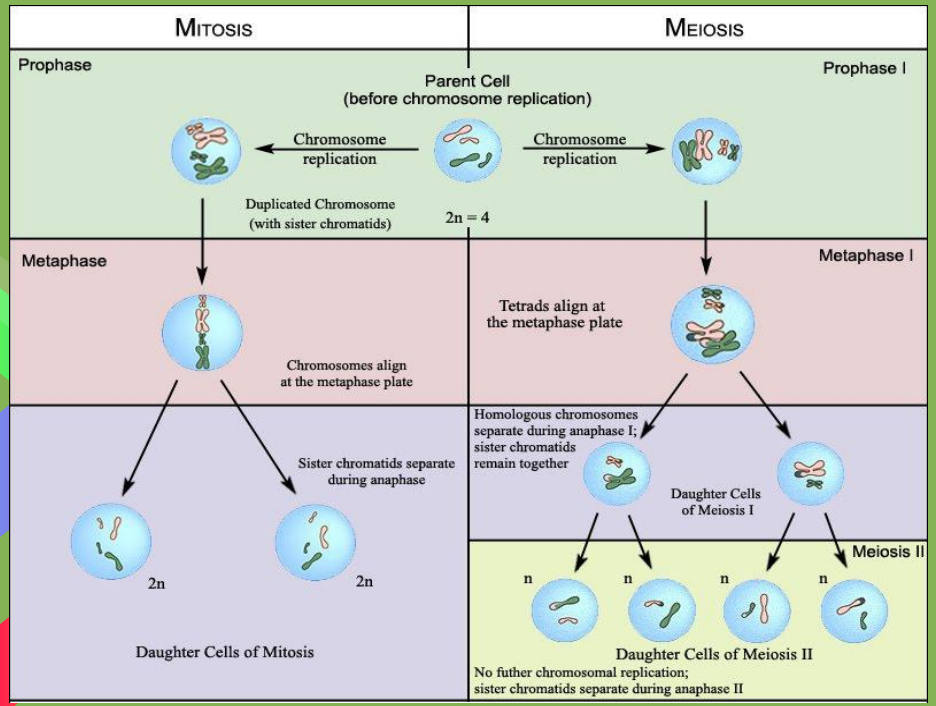
The most important part to cell growth and reproduction is Mitosis... Make sure you know the definition and purpose. (Definition and Purpose are below).

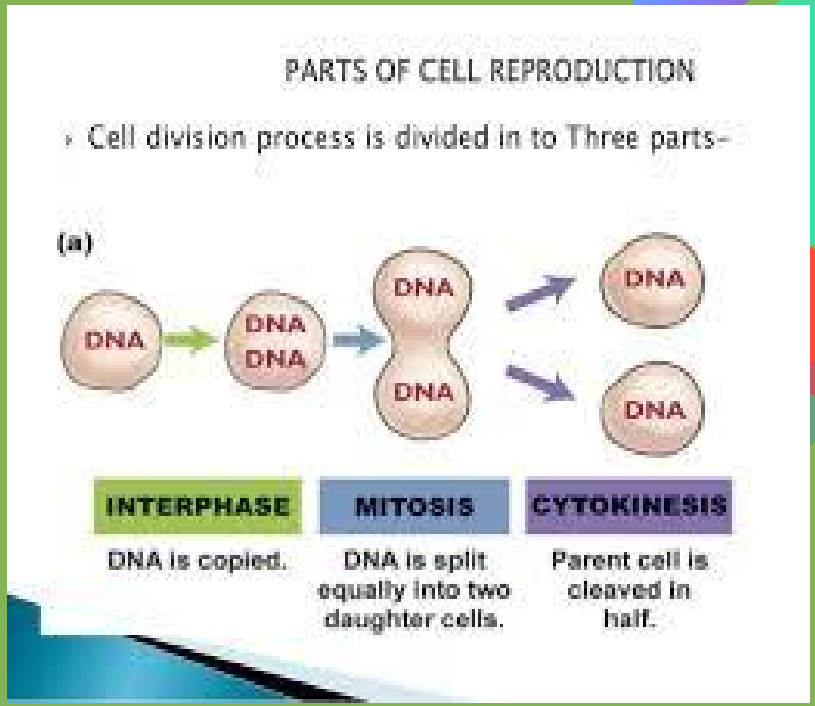
Mitosis: the key to cell growth and reproduction.

Definition: A single cell that divides into two identical daughter cells.

Purpose: Is to replace worn out cells with healthy new ones.

Visual of Cell growth and Reproduction





Key terms

Anaphase- Phase of mitosis where centromeres split and the chromatid pairs of each chromosome are pulled apart by microtubules

Cell cycle- A continuous sequence of growth and division in a cell

Centriole- In animal cells a pair of small cylindrical structures made of microtubules that duplicate during interphase and move to opposite ends of the cell during prophase

Centromere- Cell structure that joins two sister chromatids of a chromosome

Chromatin- Long tangled strands of DNA found in the eukaryotic cell nucleus during interphase

Chromosome- Cell structure that carry the genetic material that is copied and passed from here ration to generation of cells

Cytokinesis- Cytoplasm divides following mitosis or meiosis

Interphase- Cell growth phase where cell increases in size, carries on metabolism, and duplicated chromosomes before cell division

Metaphase- Short second phase of mitosis where doubled chromosomes move to the equator of the cell 6 chromatids are attached by centromeres to a desperate spindle fiber

Questions

1) The larger a cell becomes, the more demands the cell places on its DNA.

A. True or B. False

2) The two parts of cell division of the nucleus of a cell with identical daughter cells

A. Interphase-cytokinesis B. Prophase-telophase C. Interphase-mitosis

D.Prophase-anaphase

3) Which of the following sequences below is the correct order of mitosis?

A. Interphase-metaphase-anaphase-prophase

B. Prophase-metaphase-anaphase-telophase

C. Interphase-prophase-metaphase-anaphase

D. Prophase-anaphase-telophase-cytokinesis

Questions Cont.

4) Phase of mitosis in which cells line up in the middle of the cell.

A. Prophase B. Interphase C. Anaphase D. Metaphase

5) Which of the following is least likely a risk of cancer?

A. Smoking B. Drinking C. Age D. Diet

6)Which type of cell division make the sister chromatids separate And become individual Chromosomes?

A.Prophase B. Metaphase C. Telophase D. Metaphase

7) In Which phase does a cell plate form in the plant cell And a cleavage furrow in the animal cell which separates into two membranes?

A.Telophase B.Metaphase C.Metaphase D. Cytokinesis

8) The busiest part of the cell division in which G1, S, G2 occurs Where DNA is replicated...

A. Metaphase B. Interphase C. Anaphase

9) If a cell has 46 chromosomes, and undergoes mitosis, How many chromosomes will be in each daughter cell?

A. 23 B. 26 C.46 D. 18

Questions Cont.

When chromosomes are copied they form…

A. Centrioles

B. Chromatids

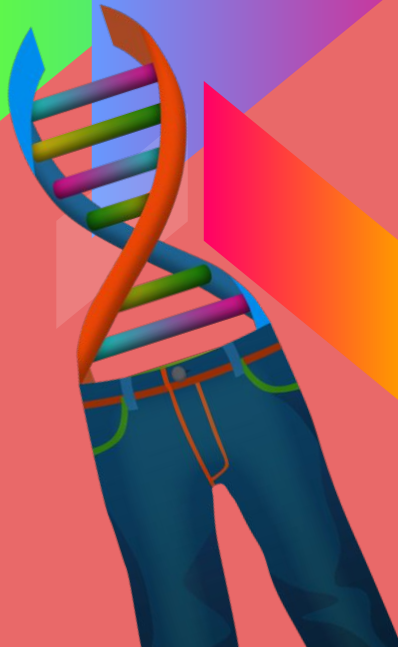
C. Spindle Fibers

D. Centromeres

Answer 🔑

1) True
2) Interphase Mitosis
3) Prophase- Metaphase- Anaphase- Telophase
4) Metaphase
5) Age
6) Anaphase
7) Cytokinesis (Trick Q)
8) Interphase
9) 46
10) Chromatids

6.
Genetics



Objective

After reviewing this section, students will have an understanding of basic genetics and heredity. Students will also get an understanding of the Mendelian and non mendelian modes of inheritance, the basic structure of DNA and chromosomes, replication, mutation, and the stages of mitosis and meiosis.

Summary

Genetics is the study of genes and their variations in living organisms. Genes come in different versions which are called alleles and every sexually reproducing organism has them. Most traits people get are polygenic which means they are determined by genes from different chromosomes. Genotypes are combinations of different alleles and phenotypes are the appearances of certain traits. Knowing the phenotype can help determine what features a pregnant woman's baby might have such as blue eyes or red hair. Punnett Squares help to narrow down options of the probability of a child receiving a certain trait or even mutation from the parents. Pedigree charts are used to trace back where the actual trait came from.

Key Terms

Alleles- alternate forms or varieties of a gene..
Chromosomes- thread-like, gene-carrying bodies in the cell nucleus.
Crossing-over- the exchange of genetic material between homologous chromosomes in meiosis.
DNA (deoxyribonucleic acid)- a large organic molecule that stores the genetic code.
Double helix- the twisted ladder shapes that is characteristic of DNA molecules
Eukaryotic- multicellular organisms
Gametes- sex cells: sperm or unfertilized egg cells produced in the testes and ovaries of animals.

Zygote-fertilized egg

Genes- units of inheritance usually occurring at specific location,on a chromosome. Genes are responsible for hereditary characteristics.
Genotype- the genetic makeup of an individual.
Heritability- percentage of phenotypic variation attributable to genotypic variation.
Heterozygous- a genotype consisting of two different alleles of a gene for a particular trait (Tt).
Meiosis- cell division in specialized tissues of ovaries and testes, which results in the production of gametes.
Mitosis- the simple cell division process that occurs in somatic cells.

Key terms

Mutation- an alteration of genetic material such that a new variation is produced.
Nucleotide- the basic building block of DNA and RNA. It consists of any one of four bases attached to a sugar and phosphate.
Phenotype- the observable characteristics of an organism: the physical expression of a genotype.
RNA (ribonucleic acid)- a type of nucleic acid that is found in both the nucleus and the cytoplasm of cells.
Species- a natural population of organisms that can interbreed to produce fertile offspring.

Questions

1. What is an example of a genetic mutation?
    a. Heterozygous
    b. Cystic fibrosis
    c. Allele
    d. Hemophilia
2. Non-sex chromosomes are called what?
    a. Y-chromosomes
    b. Autosomes
    c. X-chromosomes
3. A pedigree chart can be used for:
    a. Tracing trait inheritance through many generations
    b. Determining blood type
    c. Masking disorders
4. What is the difference between a genotype and a phenotype?
5. What are Punnett Squares used for?

Questions

1. What is an example of a genetic mutation?
   a. Heterozygous
   b. Cystic fibrosis
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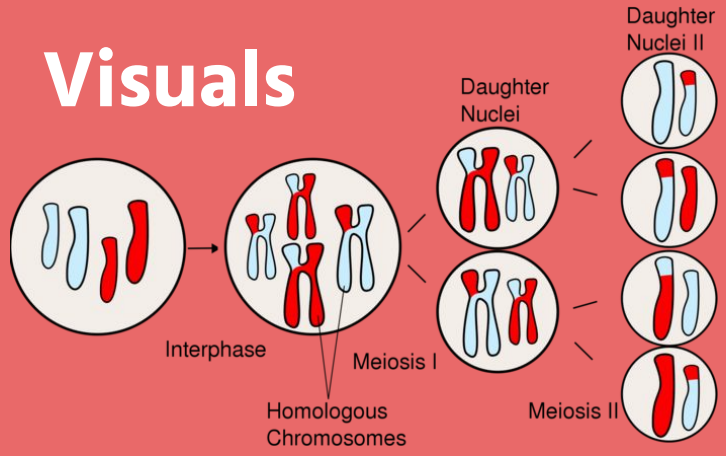
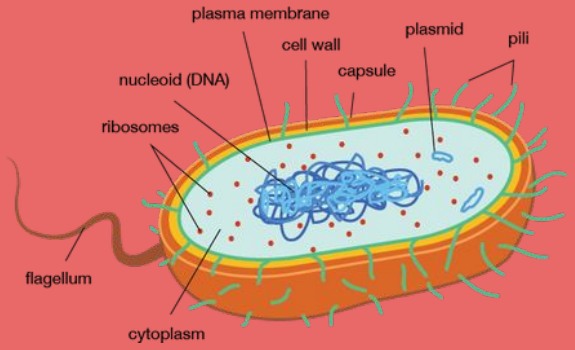
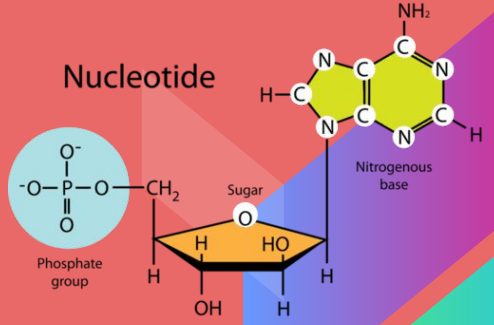
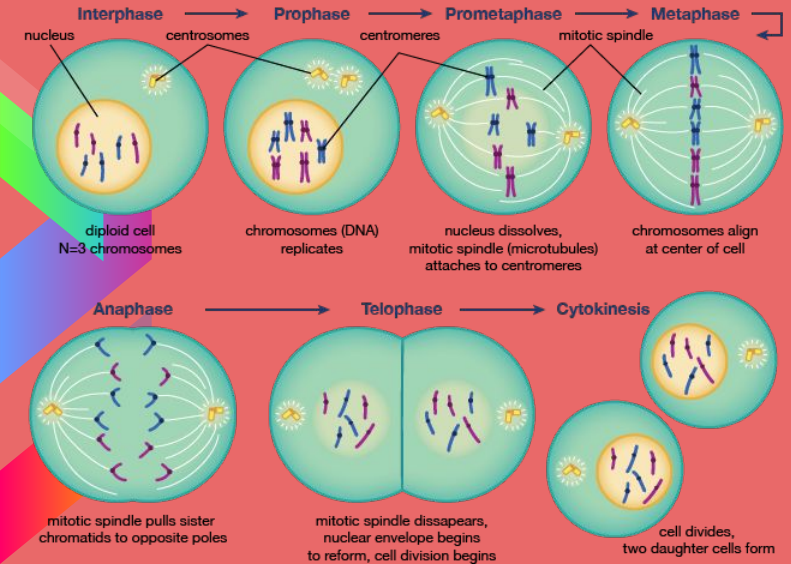
   c. X-chromosomes
3. A pedigree chart can be used for:
   a. Tracing trait inheritance through many generations
   b. Determining blood type
   c. Masking disorders
4. What is the difference between a genotype and a phenotype?
   a. Genotypes are combinations of different alleles in a certain gene while phenotypes is the appearance of a trait.
5. What are Punnett Squares used for?
   a. Punnett Squares are used to show possible allele combinations and phenotype offspring.

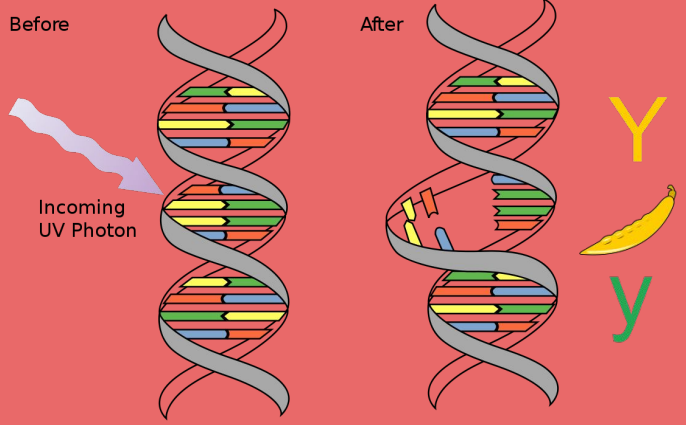
Visuals

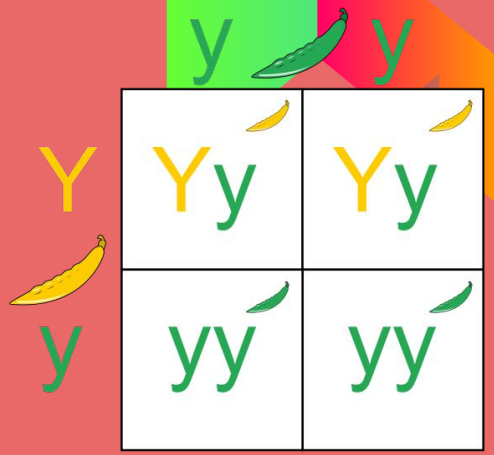

Daughter Nuclei II
Daughter Nuclei
Interphase
Meiosis I
Homologous Chromosomes
Meiosis II


plasma membrane
cell wall
plasmid
pili
nucleoid (DNA)
capsule
ribosomes
flagellum
cytoplasm


Nucleotide
Phosphate group
Sugar
Nitrogenous base


Interphase
Prophase
Prometaphase
Metaphase
nucleus
centrosomes
centromeres
mitotic spindle
diploid cell N=3 chromosomes
chromosomes (DNA) replicates
nucleus dissolves, mitotic spindle (microtubules) attaches to centromeres
chromosomes align at center of cell
Anaphase
Telophase
Cytokinesis
mitotic spindle pulls sister chromatids to opposite poles
mitotic spindle dissapears, nuclear envelope begins to reform, cell division begins
cell divides, two daughter cells form


Before
Incoming UV Photon
After


y
y
Y
y
Yy
Yy
yy
yy

7.
Theory of Evolution

Objective

After reviewing this section students will get a general idea on the theory of evolution, natural selection and Charles Darwin who formulated the theory of evolution by natural selection

Summary

Evolution is the belief that every species on earth has a common ancestor and has descended from a previously existing species, it is believed that over time new traits evolve in certain species and scientist use this evidence to find evolutionary relationships. To find this evidence they look at fossils, different types of anatomy, genes, other types of molecules, and etc to try to prove this theory.

Key Terms

Evolution: a process by which modern organisms have descended from ancient organisms

Theory: a well-supported testable explanation of phenomena that have occurred in the natural world

Fossils: preserved remains of ancient organisms

Artificial selection: Selection by humans for breeding of useful traits from the natural variation among different organisms

Fitness: the ability for an individual to survive and reproduce in its specific environment

Adaptation: any inherited characteristic that increases an organism's chance of survival

Survival of the fittest: a natural process resulting in the evolution of organisms best adapted to the environment

Natural selection: the surviving of the fittest

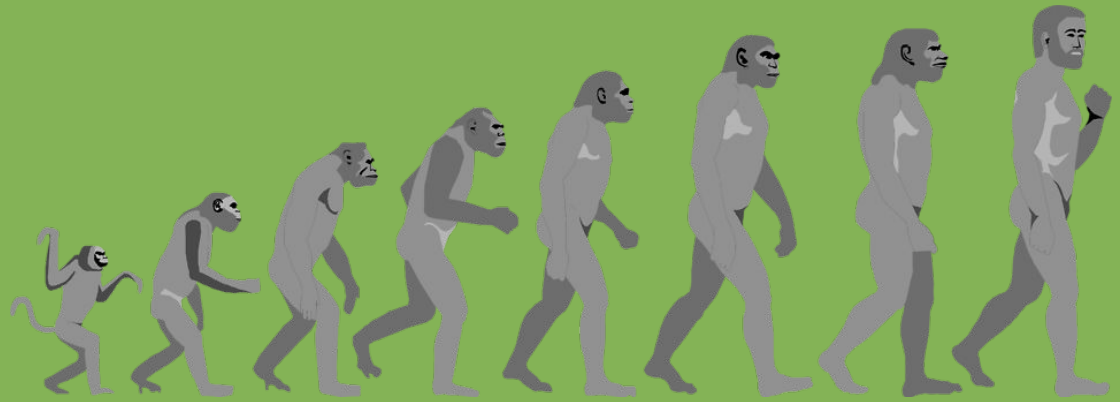
Descent with modification: principle that each living species has descended with changes from other species over time

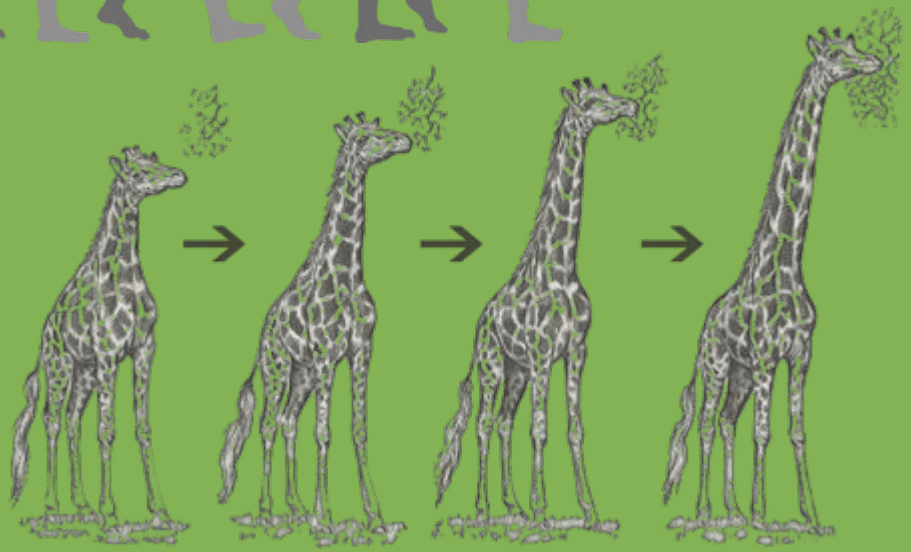
Common descent: principle that all living things were derived from common ancestors

Homologous structures: structures that have different mature forms but develop form the same embryonic tissues

Vestigial organ: organ that serves no useful function in an organism

Visuals





Questions

1: Who founded the theory of evolution?

A. Charles Darwin
B. Gregor Mendel
C. Isaac Newton

2: What year was the theory made?

A. early 19th century
B. mid 19th century
C. late 19th century

3: all organisms share a _____.

A. Common ancestor
B. Cell structure
C. Genome

Questions

4. What is natural selection?

5. Explain the difference between macroevolution and microevolution.

8.
Ecology

Objective

Students will be able to understand the basics of ecological succession, the dynamics population and growth, and biomes. They will also learn the food chain and climate change.

Summary

Ecology, the study between organisms and their environment is the reason humans and animals are able to exist on earth. Biomes allow us to pick and choose an environment to live in and adapt accordingly so we can live a full life. Terrestrial biomes includes tropical, temperate, and cold. Aquatic biomes includes marine and nonmarine aquatic biomes. Through the many, many years organisms have lived on earth, the population dynamics have changed and new herbivores and carnivores move in and out of the areas to get to better grasses or prey. Plants tend to be producers so the herbivores which are consumers can eat them and produce energy. Carnivores are also consumers and feed off the herbivores and they digest any waste they have into the decomposers which help to also fuel the plants (producers) and the process starts all over again.

Key Terms

- Ecology
  - Study of relationships between organisms and their environment
- Organism
  - Any living creature
- Biome
  - An area where certain plants and animals have either naturally been able to live or have adapted to the weather and species around it
    - Biotic factor: living
    - Abiotic: nonliving
- Succession
  - The process of the ecosystem changing over time
    - Primary succession: occurs on surfaces that didn't previously have plant life on it (ex: rock)
    - Secondary succession: occurs on surfaces that have always supported plant life (ex: soil/grass)
  - Population dynamics
    - Data that has the information of plant and animal mortality rates and the amount of animals moving in or out of the area

Key Terms

- Herbivore
  - An animal that consumes plant life; often treated as prey (antelope/deer/chicken)
- Carnivore
  - An animal that often consumes other animals; predators (dogs/cats/bears/sharks)
- Producers
  - Living organisms that produce energy from the sunlight such as plants or bacteria
- Consumers
  - Living organisms that feed off of the producers to create energy
- Endemic species
  - Animals that still live in their original ecosystems
- Nonnative species
  - Animals that don't live in their original ecosystems; also called invasive species
- Biodiversity
  - The variety of life that lives in an ecosystem
- Eutrophication
  - Added nutrients that resulted in changes in the aquatic ecosystem; cause: agricultural runoff
- Greenhouse gases
  - Atmospheric gases that come from water vapors, carbon dioxide, nitrous oxide, and methane that conceal heat energy.

Key Terms

- Greenhouse effect
  - Natural process where gases in atmosphere retain heat radiating Earth's surface
  - Global warming
    - Increase in average temperatures worldwide
  - Ozone layer
    - Upper atmosphere where ozone gases are of high concentrations and absorb ultraviolet radiation that comes from the sun

Essential Questions

1. What are animals that live in the desert?
    a. Foxes, owls, and polar bears
    b. African wild dogs, camels, and coyotes
    c. Wildebeests, elephants, and zebra
2. True or false: Primary succession occurs on surfaces that always has plant life to live on it.
    a. True
    b. False
3. True or false: Endemic species are also called invasive species.
    a. True
    b. False

Essential Questions

1. What are animals that live in the desert?
    a. Foxes, owls, and polar bears
    b. African wild dogs, camels, and coyotes**
    c. Wildebeests, elephants, and zebra
2. True or false: Primary succession occurs on surfaces that always has plant life to live on it.
    a. True
    b. False** - secondary succession
3. True or false: Endemic species are also called invasive species.
    a. True
    b. False** - invasive species are called nonnative species

Essential Questions

1. What are two things that fuel plants?
   a. _____
      _____
      _____
      _____
2. Compare the key terms: *herbivore, carnivore, producer,* and *consumer.*
   a. _____
      _____
      _____
      _____

Essential Questions

1. What are two things that fuel plants?
    a. *Two things that fuel plants are energy from the sun photosynthesize and decomposers, bacteria, and fungi.*
2. Compare the key terms: *herbivore, carnivore, producer*, and *consumer.*
    a. *Herbivores tend to be consumers and they eat plants to gain energy which are producers. Carnivores are also consumers and eat the herbivores to gain energy.*

Visuals/Charts